UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/070,290	02/28/2002	Toshio Kazama	AB-1215 US	3057

32605 7590 09/25/2008

MACPHERSON KWOK CHEN & HEID LLP
2033 GATEWAY PLACE
SUITE 400
SAN JOSE, CA 95110

EXAMINER	
TSUKERMAN, LARISA Z	
ART UNIT	PAPER NUMBER
2833	

MAIL DATE	DELIVERY MODE
09/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOSHIO KAZAMA,
Appellant

Appeal 2008-5710
Application 10/070,290[1]
Technology Center 2800

Decided: September 24, 2008

Before THOMAS A. WALTZ, MARK NAGUMO, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

---

[1] Application 10/070,290, *Conductive Contact Member having a Contact Surface Protected from Solder Deposition*, filed 28 February 2002, as the national stage under 35 U.S.C. § 371 of PCT/JP01/05555, which was filed 28 June 2001. The specification is referred to as the "290 Specification," and is cited as "Spec." The real party in interest is listed as NHK Spring Co., Ltd. (Appeal Brief under 37 C.F.R. § 41.37, filed 2 November 2005 ("Br."), 2.)

A. Introduction

Toshio Kazama ("Kazama") timely appeals under 35 U.S.C. § 134(a) from the final rejection of claims 1, 2, and 4-10. We AFFIRM.

The subject matter on appeal relates to a "conductive contact member," which is an electrical probe used to test, e.g., electroconductive patterns of printed circuit boards. (Spec. 1:7-9.) Prior art conductive contact members, which are said to be made with a contacting layer made from gold with 0.3 to 0.4% cobalt on a conductive substrate, such as a rod, are said to develop deposits of solder upon repeated contact with solder-bearing objects. (Spec. 1:11-20.) The deposited solder is said to cause the electrical resistance to deviate from the expected range and to impair the accuracy of the test. The improved conductive contact members are said to be less susceptible to solder deposition.

Claim 1 is representative:

> Claim 1
> A conductive contact member for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising
>
> > a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of gold containing a small amount of silver,
> >
> > the layer being formed at least over a conductive contact part of said conductive contact member so that said conductive contact part of said conductive contact member may not be contaminated by deposition of solder from said object to be contacted.

(Claims App., Br. 11.)

The Examiner has maintained the following grounds of rejection:[2]

A. Claims 1, 4-7, 9, and 10 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Chang[3] and Onodera.[4]

B. Claim 2 stands rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Chang, Onodera, and DiRenzo.[5]

C. Claim 8 stands rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Chang, Onodera, and Loranger.[6]

B. Findings of Fact

Findings of fact (FF) throughout this Decision are supported by a preponderance of the evidence of record.

The 290 Specification

1. According to the 290 Specification, a primary object of the claimed invention is to provide a conductive contact member having low electric resistance over a prolonged period of time that does not develop solder deposits upon repeated contact with solder on tested objects. (Spec. 2:1-9.)

---

[2] Examiner's Answer mailed 30 August 2007 ("Ans.")

[3] David D. C. Chang, *Electrical Test Apparatus and Method*, U.S. Patent 5,500,605 (1996).

[4] Tokiichi Onodera and Matsujirou Ikeda, *Electric Contact Structure as well as Relay and Switch using the Same*, U.S. Patent 6,133,537 (17 October 2000).

[5] Simon DiRenzo, *Method of Forming Electrical Connections with Solder Resistant Surfaces*, United States Patent 3,599,326 (1971).

[6] J. Albert Loranger and Wotaek Chung, *Electrical Socket with Floating Guide Plate*, U.S. Patent 5,791,914 (1998).

2. The 290 Specification teaches that "the base material for the conductive contact member may consist of inexpensive material having favorable mechanical properties such as steel." (Spec. 3, 1-2.)

3. The conductive contact member is prepared by coating the base material with a highly electrically conductive material that is resistant to solder deposition. (Spec. 2:10-16.)

4. The material for the highly electrically conductive material "preferably consists essentially of gold added with 0.01% to 8% of silver." (Spec. 2:19-20.)

5. The preferred method of preparing the contact member is said to be electroplating, but electroless plating, sputter, PCV (plasma vapor deposition), CVD (chemical vapor deposition), and thermal spraying are also said to be examples of useful deposition techniques. (Spec. 2:16-18.)

6. In the words of the 290 Specification, "owing to such resistance to solder deposition, the deposition of solder to the conductive contact part is minimized even when it is repeatedly applied to objects to be contacted, and the frequency of replacing the conductive contact part can be reduced." (Spec. 2:23-25.)

Chang

7. Chang relates to an improvement in a ball grid array testing device. (Chang 1:12-30.)

8. According to Chang, a ball grid array (BGA) provides a matrix array of solder ball terminals on a lower surface, which are to form contacts with

integrated circuit chips or other devices on an upper surface. (Chang 1:12-17.)

9. Chang states, "[a]fter BGA modules have been constructed, they of course must be tested, which requires a temporary connection to all or most of the solder balls contained on the lower surface." (Chang 1:22-25.)

10. In one configuration of the testing device, an array of spring-loaded probes is arranged to match the array of solder balls. (Chang 1:33-38.)

11. Then an insulating template is formed with an array of apertures matching the array of solder balls. (Chang 1:38-50.)

12. In Chang's words, "[t]he balls of the electronic device are then inserted into the aperture, and, as the device is forced toward the conductive probes, the template moves against a spring bias so that the balls can all make contact with the probes." (Chang 1:49-53.)

13. Chang continues, "[t]he probes themselves are spring-loaded and each have [sic] a needle projection for piercing a solder ball and insuring good electrical contact." (Chang 1:53-56.)

Onodera

14. According to Onodera, smaller sized electrical contacts in ever-smaller switches and relays require improved sensitivity to small contact forces or pressures. (Onodera 1:6-18.)

15. Onodera teaches that it is especially important "to keep a stability of an initial contact resistance," and that a preferred way to do this is to use a contact surface layer made of a soft metal. (Onodera 1:19-22.)

16. According to Onodera, it was known that Au (gold) and Au/Ag (gold/silver) alloy are highly conductive, soft, and show plastic deformation. (Onodera 1:30-34.)

17. According to Onodera, the plastic deformation may cause adhesion of one contact surface of Au or Au/Ag with an opposite surface of Au or Au/Ag, leading to a loss of reliability [in the switches and relays]. (Onodera 1:34-37.)

18. Onodera teaches further that adhesion may arise due to external vibration during the non-operating state. (Onodera 1:51-55.)

19. According to Onodera, "[i]t is effective to reduce the content of Au in the contact surface layer for improvement in the anti-adhesion property." (Onodera 1:67-2:2.)

20. However, this improvement in anti-adhesion is said to reduce the stability of the contact resistance. (Onodera 2:2-4.)

21. Onodera "provides an electric contact structure comprising a first contact surface and a second contact surface, wherein at least one of the first and second contact surfaces comprises an AuAgPd [gold-silver-palladium] alloy including 7-16% by weight of Ag and 1-10% by weight of Pd, whereby a high anti-adhesion property and a highly stable contact resistance can be obtained particularly when the electric contacts are in [a] non-operating state." (Onodera 3:22-30.)

22. According to Onodera, the other contact surface may be gold (Onodera 3:31-35) or it may be an AuAg alloy (*id.* at 37-40).

23. According to Onodera, the AuAgPd contact layers may be formed on an alloy layer that is in turn formed on a base metal layer. (Onodera 4:3-5.)

24. Onodera instructs that if the content of Ag is excessively low, e.g., less that 5% by weight, then the desired anti-adhesion property is not good. (Onodera 4:38-42.)

25. The effects of less Ag may be compensated by adding more Pd, but too much Pd is said to lead to formation of an insulator known as "brown powder" due to reaction with organic substances: thus the electrical contact is degraded. (Onodera 4:42-47.)

26. On the other hand, if the Ag content is too high, e.g., greater than 20% by weight, sulfide formation is said to be difficult to suppress. (Onodera 4:47-49.)

27. Hence, according to Onodera, it was found that the preferred amount of Ag is 7-16% by weight. (Onodera 4:49-51.)

28. Onodera describes tests with relays shown in Figure 1 (not reproduced here) with movable and fixed contacts **110** and **120** being made with the improved contact layers. (Onodera 5:58-63.)

29. The improved contacts, shown in Figure 2 (not reproduced here), have a layer **230** of base metal about 85 μm thick, an intermediate alloy layer **220** about 62 μm thick, and a contact surface layer **210** about 3 μm thick. (Onodera 6:11-20.)

30. In Example 5, Onodera describes a relay in which the break movable contact has a break movable contact surface layer of the alloy $Au_{86}Ag_8Pd_6$

(86 w% Au, 8 w% Ag, and 6 w% Pd), and a break fixed contact surface layer of $Au_{92}Ag_8$ (92 w% Au, 8 w% Ag). (Onodera 6:60-67.)

C. Discussion

The burden is on Kazama, as the Appellant, to prove reversible error in the Examiner's rejections. *See, e.g., In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

Rejection A (Claims 1, 4-7, 9, 10)

The Examiner finds that Chang teaches a contact member **25**. (Ans. 4.) The Examiner finds further that the contact member described by Chang does not have a layer of gold containing a small amount of silver as required by the claims. (*Id.*) The Examiner relies on Onodera for such a layer, and argues that it would have been obvious to use the AuAgPd alloy, which provides high-anti-adhesion properties and highly stable contact resistance, in the structure (i.e., the contact member) taught by Chang. (*Id.*)

Kazama objects that Chang is directed toward making reliable and robust electrical contact for high density BGAs. (Br. 5.) Chang is not, according to Kazama, concerned with avoiding solder deposition on contact members. (*Id.*) Kazama argues further that there is no basis in the art for combining or modifying the teachings of Chang with the teachings of Onodera. (Br. 5.)

These arguments are not persuasive. Providing a reliable and robust electrical contact is not inconsistent with providing the non-adhesive, highly stable contact resistance. Thus, the Examiner has provided "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness" required by our reviewing court. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), (cited with approval, *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007)).

Kazama objects further that Onodera is directed to AuAgPd alloys for contact surface layers in switches and relays, and that "Onodera teaches that AuAg without Pd may cause the loss of contact reliability and the addition of Pd is at the center of its invention. Accordingly, Onodera teaches away from using a layer essentially consisting of an alloy of gold and silver or a homogenous mixture of gold added with silver." (Br. 6; emphasis not reproduced.)

These arguments are premised on an improper, narrow reading of the claims. The conductive contact members covered by claim 1 have a layer "essentially consisting of gold containing a small amount of silver." Claims 9 and 10 recite similar limitations for this layer, namely, "an alloy of gold added with silver" (claim 9), and "a homogeneous mixture of gold added with silver" (claim 10). The transitional term "essentially consisting of" is not a standard phrase in patent claims. Nor does that phrase appear in the 290 Specification. However, a grammatical variant of the standard transitional phrase, "consisting essentially of," is used in the 290 Specification in the sentence "[t]he highly electrically conductive material preferably *consists essentially of* gold added with 0.01% to 8% of silver." (Spec. 2:19-20; FF 3; emphasis added.) There appears to be no

indication in the record that Kazama meant anything different by the different word order in these transitional phrases. As the claims cannot encompass anything other than what is encompassed and described in the specification, we construe the transitional phrase "essentially consisting of" to be synonymous with the transitional phrase "consisting essentially of."[7] The transitional phrase "consisting essentially of" is similar to the transitional term "comprising," in that the phrase opens the claim to any and all materials that would not materially change the basic and novel and properties of the disclosed invention. *In re Janakirama-Rao*, 317 F.2d 951, 954 (CCPA 1963) ("The word 'essentially' opens the claims to the inclusion of ingredients which would *not* materially affect the *basic* and *novel* characteristics of appellant's compositions as defined in the balance of the claim . . . ").

According to the 290 Specification, the basic and novel property of the disclosed conductive contact member is the resistance to solder deposition due to the AuAg contact layer. (Spec. 2:1-9; FF 1.) These properties are taught to be characteristic of AuAg alloys that contain 0.01 to 8% silver. (Spec. 2:19-20; FF 4.) Because this range is said to be preferred, it is evident that AuAg alloys containing somewhat higher amounts of silver—the exact upper limit is not apparent on this record—also possess this property.

Onodera teaches that AuAgPd layers containing 7-16 w% Ag and 1-10 w% Pd are not adhesive. (Onodera 2:43-50; FF 21.) Moreover,

[7] The presence of the phrase "essentially consisting of" in original claim 3, which recites "gold added with silver" (Spec. 24:11-12) does not alter this analysis.

Onodera indicates that lower amounts of Ag, down to about 5 w%, may be acceptable. (Onodera 4:38-42; FF 24.) Thus, the range of overlap, considering the lower amounts of Ag apparently acceptable to Onodera and the higher amounts of Ag apparently acceptable to Kazama, is substantial. In parallel with the Examiner (Ans. 5), we find it reasonable to presume that AuAgPd alloys described by Onodera are resistant to solder deposition, based on their similar composition to the AuAg alloys disclosed in the 290 Specification as well as Onodera's description that they are relatively nonadhesive compared to pure AuAg alloys. There appears to be no evidence in the present record indicating that the presence of palladium changes the basic and novel characteristics of the AuAg layer recited in claim 1. Accordingly, there is no basis to exclude the AuAgPd alloys taught by Onodera from the scope of materials "essentially consisting of gold containing a small amount of silver."

Moreover, Onodera does not "teach away" from using a layer of AuAg as a surface contact layer on a conductive contact member. Onodera teaches that at least one contact member of the disclosed switches must comprise an AuAgPd surface contact layer, but that the other surface contact layer can be Au or AuAg. (Onodera 3:30-40; FF 22.) In fact, Onodera provides an example in which one surface contact layer is the alloy $Au_{86}Ag_8Pd_6$ (86 w% Au, 8 w% Ag, and 6 w% Pd) and the other is the alloy $Au_{92}Ag_8$ (92 w% Au, 8 w% Ag). (Onodera 6:60-67; FF 30.) Both alloys are conductive contact members having the physical structure and the chemical composition required by the claims.

We conclude that Kazama's arguments are based on an improper narrow reading of its claims. Moreover, Kazama has failed to show reversible error in the Examiner's findings of fact or conclusions of law.

Rejection B (Claim 2)

Claim 2 requires that the highly electrically conductive AuAg layer resistant to solder deposition recited in claim 1 be formed by plating. (Ans. 6.) The Examiner has rejected this claim in view of the combined teachings of Chang, Onodera, and DiRenzo. The Examiner relies on DiRenzo for teaching plated pins **12** and argues that it would have been obvious to use the well-known coating method of plating to make the "Chang-Onodera structure." (*Id.*)

Kazama argues that the rejection of claim 2 is improper because DiRenzo does not teach a single layer of gold with a small amount of silver as recited in claim 1, from which claim 2 depends (Br. 8); that DiRenzo is nonanalogous art (*id.* at 9); that there is no teaching to combine the references (*id.*) ; and that DiRenzo does not cure the alleged deficiencies of Chang and Onodera (*id.*) .

These arguments are not persuasive of reversible error. Claim 2 is a product-by-process claim. Thus, it reads on any product, no matter how made, that has all the properties of a product made by the recited process. As our reviewing court has instructed, "[i]f the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1317 (Fed. Cir. 2006), *quoting In re Thorpe*, 772 F.2d 695, 697 (Fed. Cir. 1985).

Kazama has not directed our attention to any credible evidence of record that layers formed by plating differ in any material way—or would have been expected by those of ordinary skill in the art to differ in any material way—from layers formed by any other process suitable for forming the layers. Thus, to the extent that the Examiner erred by treating claim 2 as a process claim, that error was harmless.

Rejection C (Claim 8)

Kazama argues only that Loranger does not cure the alleged deficiencies of Chang and Onodera. (Br. 9.) As we have found no reversible error in the Examiner's reliance on Chang and Onodera, we summarily AFFIRM the rejection of claim 8.

D. Summary

In view of the record and the foregoing considerations, it is:

ORDERED that the rejection of claims 1, 4-7, 9, and 10 under 35 U.S.C. § 103(a) in view of the combined teachings of Chang and Onodera is AFFIRMED;

FURTHER ORDERED that the rejection of claim 2 under 35 U.S.C. § 103(a) in view of the combined teachings of Chang, Onodera, and DiRenzo is AFFIRMED;

FURTHER ORDERED that the rejection of claim 8 under 35 U.S.C. § 103(a) in view of the combined teachings of Chang, Onodera, and Loranger is AFFIRMED;

FURTHER ORDERED that no time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

rvb

MACPHERSON KWOK CHEN & HEID LLP
2033 Gateway Place
Suite 400
San Jose, CA 95110